



8-Hour Ozone and PM_{2.5} Standards in Kentucky

Implementation

October 2004



What we know... or not

◆ Brief overviews on

- implementation of the 8-hour ozone standard
 - ◆ Designations
 - ◆ timetables
- Implementation of the new fine particulate standard
 - ◆ EPA's position on designations
 - ◆ timetables

Ozone is...

- ◆ Ozone is typically not emitted, but formed from other pollutants
 - Nitrogen Oxides (NO_x)
 - Volatile Organic Compounds (VOCs)
- ◆ Ozone irritates the respiratory system, reduces lung function, aggravates asthma and chronic lung diseases.
- ◆ Repeated ozone damage to children's developing lungs may lead to reduced lung function later in adulthood.

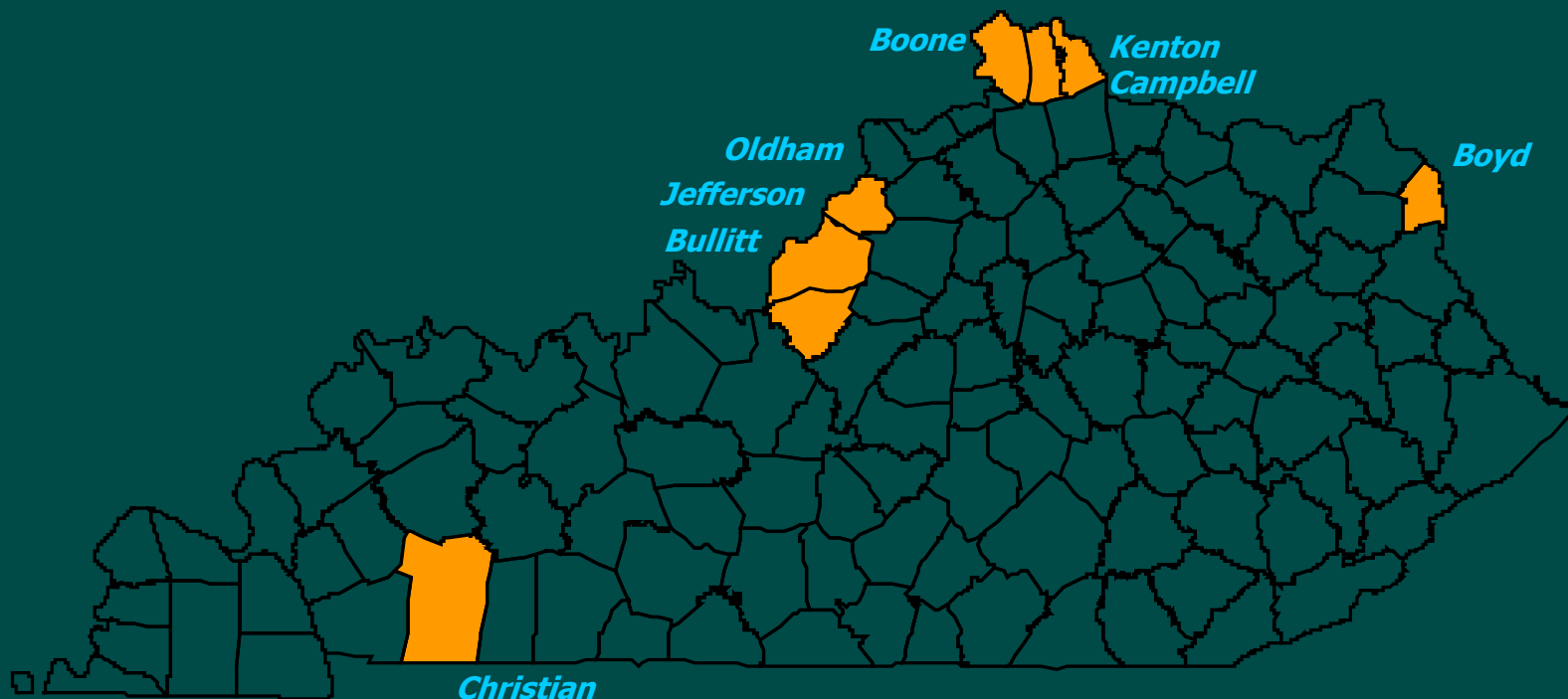
Ozone Standard

- ◆ 8-hour standard adopted in 1997
- ◆ More stringent than previous standard
 - ◆ .08 ppm
 - ◆ 3 years of monitoring data
 - ◆ 4th highest 8 hour value / each year
- ◆ violation exists if average = .085 or greater
- ◆ EPA mandated by the Clean Air Act to protect human health within an adequate margin of safety

Effective Dates

- ◆ Designations became effective on June 15, 2004
- ◆ Schedule for SIP submittal based on classification of areas
 - Subpart 1
 - Subpart 2
 - ◆ Additional classifications
- ◆ All areas in Kentucky classified under subpart 1
 - Basic Nonattainment
 - SIP due on June 15, 2007

8-Hour Ozone Nonattainment Areas



2003/2004 Summary of Ozone Monitoring Data

4th Highest Maximum 8-hour average

	2001	2002	2003	2003 3yr avg	2004	2004 3yr avg
Boone	0.083	0.094	0.078	0.085	0.070	0.080
Kenton	0.082	0.096	0.079	0.085	0.073	0.082
Campbell	0.088	0.102	0.085	0.091	0.076	0.087
Boyd	0.085	0.102	0.088	0.091	0.068	0.086
Jefferson	0.081	0.096	0.075	0.084	0.070	0.080
Bullitt	0.082	0.091	0.072	0.081	0.067	0.076
Oldham	0.086	0.091	0.082	0.086	0.076	0.083
Christian	0.082	0.093	0.080	0.085	0.072	0.081

Implementation Guidance



◆ EPA released Phase I guidance

- Provided information on how designations were made
- Provided designations
- 1-hour standard to be revoked in June 05

◆ Phase II guidance

- EPA behind schedule
- Should contain requirements for areas to meet
 - ◆ Acceptable attainment demonstrations
 - ◆ Detailed guidance for “basic” areas under Subpart 1

Nonattainment Impacts

◆ Industry Requirements

- Affects industries inside nonattainment boundaries
 - ◆ Tighter emission controls
 - RACT - LAER (lowest achievable emission rate)
 - ◆ Must obtain emission offsets for increased emissions in area
 - Greater than 1:1
 - Provides a net air quality benefit - allows an area to move toward attainment while still allowing some industrial growth
- Smaller industries and modifications not directly affected immediately

Nonattainment Impacts *(continued)*

◆ Transportation/Road Plans

- Emissions from vehicles must be estimated and growth projected
- If a mobile emissions increase is projected, federal highway money not eligible for use in plan
 - ◆ Safety projects are exempt and federal funds can still be used

Ongoing Activities

- ◆ Initial SIP submittal due in 2007
- ◆ Agency in process of developing extensive inventories
- ◆ Will be setting up work groups in each area to review potential controls if necessary



Fine Particulate

Where we are today...

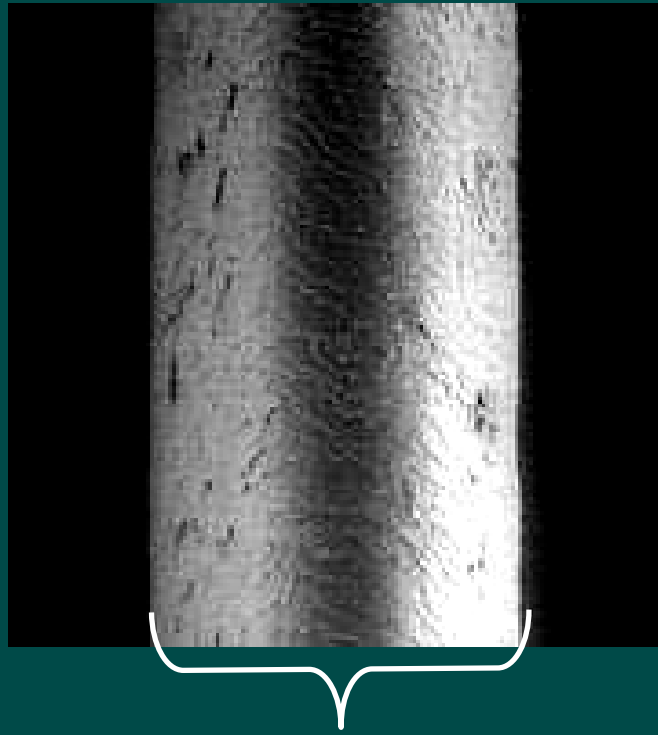


Fine Particle Standards

- ◆ EPA adopted new standards in 1997
- ◆ National standards
 - Annual: 15 micrograms per cubic meter, averaged over 3 years
 - 24-hour: 65 micrograms per cubic meter, 98th percentile averaged over 3 years
- ◆ New standards withstood all legal challenges

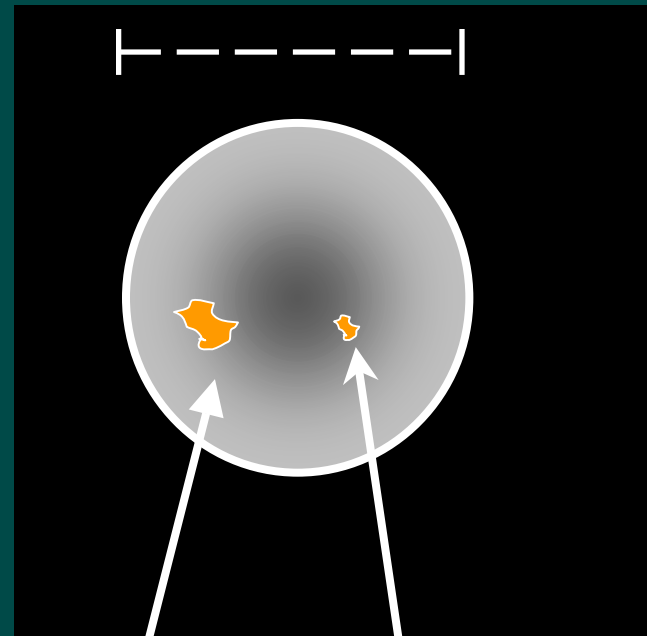
Particulate Matter: What is It?

A complex mixture of extremely small particles and liquid droplets



Human Hair (70 μm diameter)

Hair cross section (70 μm)



PM₁₀
(10 μm)

PM_{2.5}
(2.5 μm)

Wood-Burning Stoves



Power Plants



Heavy Duty Diesel Engines



Natural Sources



**Fine Particles Can Be
Emitted Directly or Formed
in the Air from Gases**

Cars and Trucks



Non-Road Vehicles



Forest Fires



Industrial Sources

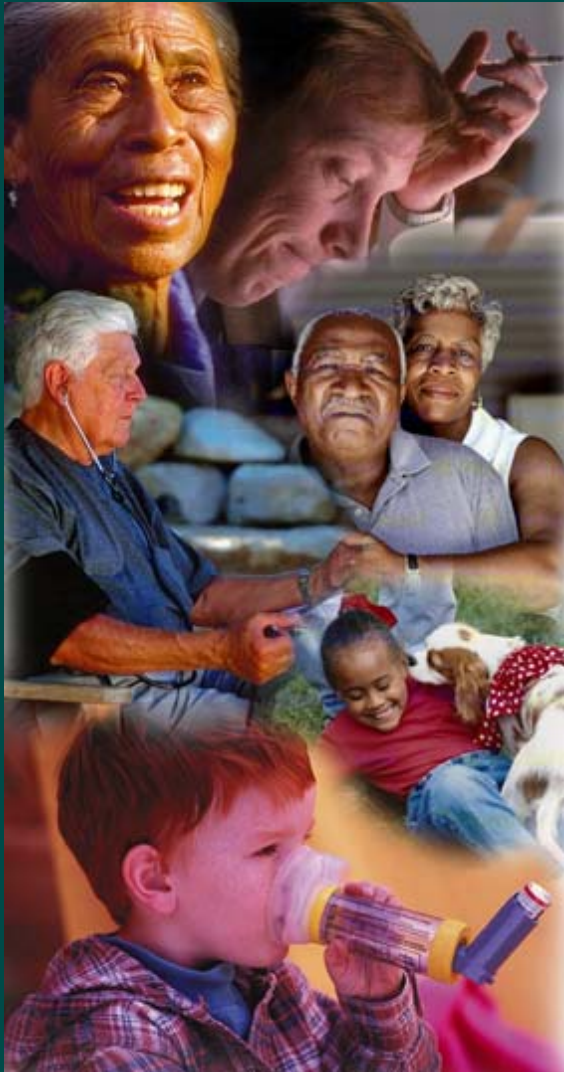


**Formed from
emissions of:**

- (SO_x), sulfur oxides
- (NO_x), nitrogen oxides
- (VOCs) volatile organic compounds
- Ammonia

- Chemically & physically diverse substances
- Exist as liquid or solid particles

Some Groups Are More at Risk



- ◆ People with heart or lung disease
 - Conditions make them vulnerable
- ◆ Older adults
 - Greater prevalence of heart and lung disease
- ◆ Children
 - More likely to be active
 - Breathe more air per pound
 - Bodies still developing

Fine Particles Reduce Visibility



- ◆ Example: Chicago in the summer of 2000.
 - Left - a clear day: $\text{PM } 2.5 < 5 \mu\text{g}/\text{m}^3$
 - Right - a hazy day: $\text{PM } 2.5 \sim 35 \mu\text{g}/\text{m}^3$

Monitoring for PM_{2.5}

◆ FRM - Federal Reference Method

- 20 counties monitored
- Monitors 24hr/3 day or 24hr/6 day schedule

◆ TEOM - Tapered Element Oscillating Microbalance

- 5 counties now - additional 6 to be located
- continuous hourly readings averaged over 24-hours
- Hourly averages vs 24 hour average
- Cannot be used for NAAQS determination
- Will be used for reporting PM_{2.5} to Air Quality Index and Air Quality Mapping/Forecasting

Monitoring for PM2.5 (continued)

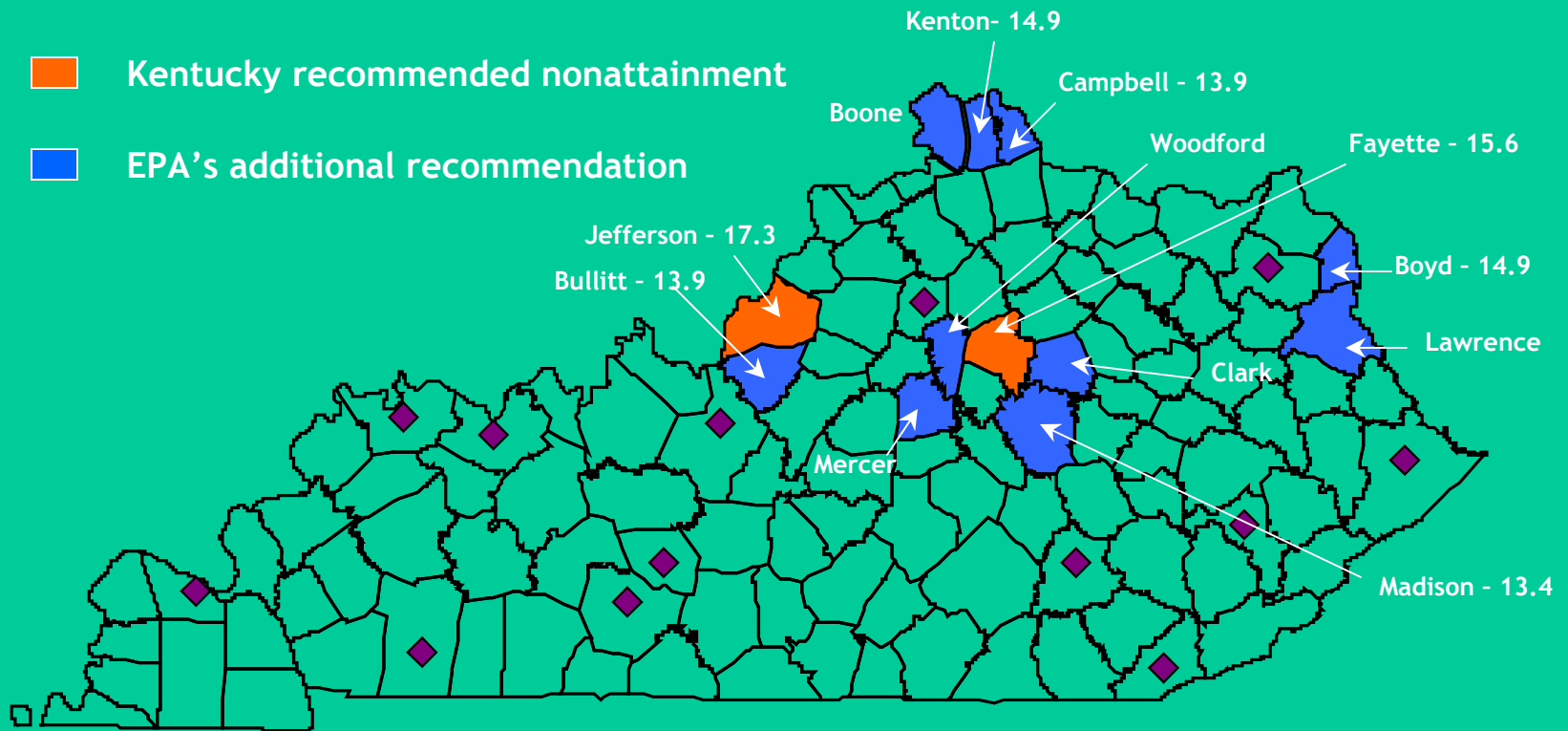
◆ Speciation Monitors

- 8 counties - typically major metro areas
- Monitors 24hr/6 days
- Used to determine chemical makeup of fine particulate
- Analysis performed by private lab thru EPA contract
 - ◆ 59 measurements including mass, nitrates, sulfates, ammonium, 3 types of carbon and 48 metals.

Schedule for Designations

- ◆ February 2004 - Kentucky submitted recommended designations
- ◆ June 29: EPA issued preliminary list of areas, allowing 120 days for comments on modifications
- ◆ Kentucky's response - August 24, 2004
- ◆ October 6 meeting with U.S. EPA to further discuss data

Potential PM_{2.5} Nonattainment Areas 2001-2003



PM_{2.5} Levels within Kentucky

(annual arithmetic mean)



Schedule for Implementation

- ◆ EPA to announce designations in November
 - Designations will be under subpart 1 of the Act
 - Final date of designations may be as late as February 05
- ◆ Implementation guidance -- uncertain timeframe
- ◆ SIP submittals will be due 3 years after designations are final
- ◆ Final attainment dates
 - As expeditiously as practicable
 - No later than 5 years after designations are final (2010)
 - ◆ Administrator may issue extensions - up to 10 years after final designations made

Summary

- ◆ Fine particles contribute to significant health and environmental effects.
- ◆ EPA intends to finalize the designations for the fine particle standards in November 2004- Effective 2005
- ◆ SIP submittals (plans to meet new standard) due three years later-- Early 2008.

Next Steps

- ◆ Unclear what may be required until EPA adopts final implementation guidance
- ◆ Many national/regional control programs are being or will soon be implemented
 - NOx SIP Call
 - CAIR Rule/BART requirements
 - New vehicle standards
 - ◆ Diesel and gasoline
 - New fuel requirements
 - ◆ Diesel and gasoline